

Test Protocol used for Preliminary Evaporative and Permeation Emissions Testing

Protocol used for Baseline Diurnal Emissions Testing on the Tecumseh Tanks

- The fuel outlets of the tanks were sealed by fusion welding with HDPE coupons.
- Tanks were filled with 450 ml of CERT fuel and the OEM fuel cap installed.
- The tanks were then soaked overnight at 68 – 86 °F.
- After soaking, a 24 – hour diurnal test was performed using a 65 °F – 105 °F temperature profile.

Protocol used for Diurnal Emissions Testing on the Tecumseh Tanks filled with Metal Mesh

- The fuel outlets of the tanks were sealed by fusion welding with HDPE coupons.
- Tanks were filled with metal mesh and 450 ml of CERT fuel. The OEM fuel cap was installed.
- The tanks were then soaked overnight at 68 – 86 °F.
- After soaking, a 24 – hour diurnal test was performed using a 65 °F – 105 °F temperature profile.

Protocol used for Diurnal Emissions Testing on the Tecumseh Tanks configured with Fuel Bladders

- The fuel outlets of the tanks were sealed by fusion welding with HDPE coupons.
- Tanks were filled with metal mesh and 100 ml of CERT fuel. An OEM fuel cap supplied by the fuel bladder manufacturer was installed.
- The tanks were then soaked overnight at 68 – 86 °F.
- After soaking, a 24 – hour diurnal test was performed using a 65 °F – 105 °F temperature profile.

Protocol used for Diurnal Emissions Testing on the Tecumseh Tanks vented to Carbon Canisters

- The fuel outlets of the tanks were sealed with Schraeder valves.
- Carbon canisters were preconditioned by adsorbing and desorbing isobutane.
- The fuel outlets of the tanks were sealed by fusion welding with HDPE coupons.
- A bulkhead union with neoprene seals was installed on the tanks to enable venting to the canisters.
- The tanks were filled with 450 ml of CERT fuel and sealed fuel caps were installed.
- The tanks were then soaked overnight at 68 – 86 °F.
- After soaking, a canister was connected using a teflon vent line.
- A 24 – hour diurnal test was performed using a 65 °F – 105 °F temperature profile.

Protocol used for Pressure Dependency Testing on the Tecumseh Tanks

Phase I

We performed permeation testing on eight saturated (previously soaked with CERT fuel for 30 days) fuel tanks. The tanks were tested at a constant temperature of 80 °F and ambient pressure for five 24-hour periods. Permeation rates for the tanks were determined gravimetrically per ARB Test Method 513.

Phase II

During phase II the tanks were re-tested at a constant temperature of 80 °F for five 24-hour periods with approximately 2.5 PSIG positive pressure. Permeation rates for the tanks were determined gravimetrically per ARB Test Method 513.

Phase III

During phase III the tanks were re-tested at a constant temperature of 80 °F for five 24-hour periods with approximately 5.0 PSIG positive pressure. Permeation rates for the tanks were determined gravimetrically per ARB Test Method 513.

Protocol used to test off-road equipment.

- We filled each tank to 50% capacity with CERT fuel.
- Each piece of equipment was operated for 15 minutes then soaked overnight at 68 – 86 °F.
- A 24 – hour diurnal test was performed using a 65 °F – 105 °F temperature profile.